

REMARKS

The Final Office Action mailed November 30, 2005, has been received and reviewed. Claims 1-14 and 25-39 are currently pending in the application. Claims 1-14 and 25-39 stand rejected. Applicants respectfully request reconsideration of the application in view of the arguments herein.

35 U.S.C. § 112 Claim Rejections

Claim 3 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

Independent claim 1 recites, in part, singulating individual components from the semiconductor wafer, leaving a ring of material comprising *at least in part* a material of the semiconductor wafer along the periphery thereof. Claim 3, which depends directly from claim 1, recites forming the ring of material *only* from the material of the semiconductor wafer. One skilled in the art would understand that the limitation of claim 3, that the ring of material is formed only from the material of the semiconductor wafer, is properly encompassed by the independent limitation that the ring of material is comprised at least in part of the material of the semiconductor material from claim 1. Therefore, because independent claim 1 provides the proper antecedent basis for the limitation of dependent claim 3, the withdrawal of the 35 U.S.C. § 112, second paragraph, rejection of claim 3 is respectfully requested.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 5,827,394 to Lu

Claim 25 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Lu, U.S. Patent No. 5,827,394 (hereinafter “Lu”). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention

must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Lu discloses a method and apparatus directed towards removing an integrated circuit die from an adhesive backing. Col. 5, lines 29-33. A semiconductor wafer (not shown) is placed upon a ultra-violet (UV) sensitive tape 30 comprised of a carrier layer 28 and a UV sensitive adhesive layer 29 before it is singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art.” Col. 6, lines 60-67; FIG. 3. An apparatus housing 34a, 34b serves as a location “for fixturing” the UV sensitive adhesive tape 30, and while “*not specifically illustrated within FIG. 3*, any of several fixturing means as are known in the art may be employed.” Col. 8, lines 32-49; FIG. 3.

Lu, however, does not anticipate each and every element, either expressly or inherently, as set forth in independent claim 25. Among others, Lu fails to anticipate a method that includes singulating individual components from a semiconductor wafer without using a film frame in its spare, unillustrated, disclosure. Col. 8, lines 43-49; FIG. 3.

Moreover, for a reference to anticipate a claim, it must set forth an “enabling disclosure of the desired subject matter; mere naming or description of the subject matter is insufficient, if it cannot be produced without undue experimentation.” *Elan Pharm., Inc. v. Mayo Found. For Med. Educ. & Research*, 346 F.3d 1051, 1054, 68 USPQ2d 1373, 1376 (Fed. Cir. 2003); M.P.E.P. § 2121.01. As Lu explicitly states, the elements 34a, 34b in FIG. 3 are meant to stand in for any one of several methods of securing a semiconductor wafer known in 1997. Col. 8, lines 43-49. Thus, this spare disclosure enables only those methods of singulating a die and supporting a wafer for dicing known at the time the patent issued.

Therefore, in view of the foregoing arguments, the withdrawal of the 35 U.S.C. § 102(b) rejection of independent claim 25 is respectfully requested.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,827,394 to Lu in view of U.S. Patent No. 6,471,806 to McKenna, et al.

Claims 1 through 6, 8 through 14, and 29 through 34 stand rejected under 35 U.S.C. §

103(a) as being unpatentable over Lu in view of McKenna, *et al.*, U.S. Patent No. 6,471,806 (hereinafter “McKenna”). Applicants respectfully traverse this rejection, as hereinafter set forth. M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

McKenna discloses a method of securing an adhesive tape to a semiconductor wafer.

Col. 2, lines 64-67; Col. 3 line 1. A partially sawn wafer 16 is held in place by a wafer chuck 14 through the use of a vacuum provided to the periphery of the wafer. Col. 4, lines 42-55; FIGs. 1-4. The apparatus positions the wafer 16 above the wafer tape 26 and the vacuum is removed, dropping the wafer 16 onto the tape 26. Col. 4, lines 56-60; FIGs. 1-4. The wafer chuck 14 is then raised, “*such that is not allowed to constrain the partially sawn wafer 16.*” Col. 4, lines 60-61; FIGs. 1-4 (emphasis added); *see* Col. 5, lines 3-6 (“Since the partially sawn wafer 16 is freely unconstrained...”). A pressure wheel 36 subsequently rolls against the back of the adhesive tape 26 causing the adhesive surface of the tape 26 to adhere to the bottom of the wafer 16. Col. 4, lines 65-67; Col. 5, lines 1-3; FIGs. 1-5. Thus, the vacuum that temporarily holds a wafer prior to depositing it on the adhesive is not applied while the wafer is mounted to the adhesive.

Neither Lu, whose teachings are set forth above, nor McKenna, teaches or suggests all the limitations in independent claim 1. Among others, neither teaches or suggests a method that includes gripping the semiconductor wafer along at least a portion of a periphery. McKenna uses a vacuum applied to the periphery of a wafer to hold the wafer prior to releasing it onto adhesive tape, but it does not teach or suggest a method of *gripping* a periphery of a wafer. *See* Col. 4, lines 16-39, 54-56; FIGs. 3-4. In addition, neither Lu nor McKenna teaches or suggests a method

that includes singulating individual components from a wafer and leaving a ring of material along a periphery. As discussed above, Lu provides merely the vaguest disclosure of a method in which a semiconductor wafer (not shown) is placed upon a ultra-violet (UV) sensitive tape 30 and singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art.” Col. 6, lines 60-67; FIG. 3. Thus, absent an improper reliance upon the specification, the vague recitation of Lu fails to teach or suggest a method that includes singulating the wafer and leaving a ring. Therefore, in view of the foregoing arguments, the withdrawal of the 35 U.S.C. § 103(a) rejection of independent claim 1 is respectfully requested.

The withdrawal of the 35 U.S.C. § 103(a) rejection of claims 2-6 and 8-14 is respectfully requested, as each of these claims depends either directly or indirectly from allowable independent claim 1, among other reasons.

Claim 2 is additionally allowable as neither Lu nor McKenna teaches or suggests a method that includes gripping a semiconductor wafer by the ring of material during the removing of at least some individual components. As discussed above, McKenna does not teach or suggest a method that includes gripping a semiconductor wafer. Even assuming, *arguendo*, one skilled in the art would construe holding a wafer in place with a vacuum comprises gripping, which applicants do not concede, the wafer remains unconstrained while adhering the tape to the wafer. McKenna, Col. 4, lines 42-60; FIGs. 1-4.

Claim 3 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes forming a ring only from the material of the semiconductor wafer. As discussed above, the meager disclosure of Lu that a wafer is singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art” does not teach or suggest the limitation in claim 3. Lu, Col. 6, lines 60-67; FIG. 3.

Claim 4 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes forming at least a portion of the ring of material from a polymer material disposed about and contiguous with a periphery of the semiconductor wafer, among others. It is respectfully noted that Lu refers to the “carrier layer [28] within the adhesive tape backing [30]” that may be formed from polymer layers, not a semiconductor wafer as the Examiner asserts.

Claim 5 is additionally allowable because neither Lu nor McKenna teaches or suggests a

method that includes forming the ring of material in part from the material of the semiconductor wafer and in part from a polymer disposed about and contiguous with a periphery of the semiconductor wafer and of thickness at least as great as a thickness of the semiconductor wafer. It is respectfully noted that Lu refers to the “carrier layer [28] within the adhesive tape backing [30]” that may be formed from polymer layers, not a semiconductor wafer as the Examiner asserts.

Claim 6 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes forming the ring of material from the polymer material by one of spin-coating, stereolithography or molding.

Claim 8 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes mounting the adhesive-coated tape to an active surface of the semiconductor wafer and singulating the semiconductor wafer from a backside thereof after backgrinding. As discussed above, the meager disclosure of Lu that a wafer is singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art” fails to teach or suggest the limitation in claim 8. Lu, Col. 6, lines 60-67; FIG. 3.

Claim 9, which depends from claim 7, is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes mounting the adhesive-coated tape to a backside of the semiconductor wafer and singulating the semiconductor wafer from an active surface thereof, for the same reason as in claim 8.

Claim 10, which depends from claim 1, is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes mounting the adhesive-coated tape to a backside of the semiconductor wafer and singulating the semiconductor wafer from an active surface thereof, for the same reason as in claim 8.

Claim 12 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes exposing the UV-sensitive adhesive prior to removing the at least some individual components while leaving a portion on the adhesive-coated tape extending over the ring of material unexposed. As discussed above, the meager disclosure of Lu that a wafer is singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art” fails to teach or suggest the limitation in claim 12.

Claim 14 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes discarding the ring of material, any remaining individual components and the adhesive-coated tape after removing the at least some individual components. As discussed above, because Lu fails to teach or suggest gripping a wafer along a periphery, it follows that Lu fails to teach or suggest disposing of a ring of material, among others.

With respect to independent claim 29, Lu, in view of McKenna, fails to teach or suggest all the limitations of claim 29 for the same reasons discussed above with respect to independent claim 1. Among others, neither teaches or suggests a method that includes gripping the semiconductor wafer along at least a portion of a periphery. In addition, neither Lu nor McKenna teaches or suggests a method that includes singulating individual components from a wafer and leaving a ring of material along a periphery. Therefore, the withdrawal of the 35 U.S.C. § 103(a) rejection of independent claim 29 is respectfully requested.

The withdrawal of the 35 U.S.C. § 103(a) rejection of claims 30-34 is respectfully requested, as each of these claims depends either directly or indirectly from allowable independent claim 29, among other reasons.

Claim 31 is additionally allowable as neither Lu nor McKenna teaches or suggests a method that includes gripping a semiconductor wafer by the ring of material while removing the at least some individual components. As discussed above, McKenna does not teach or suggest gripping a semiconductor wafer. Even assuming, *arguendo*, one skilled in the art would construe holding a wafer in place with a vacuum comprises gripping, which applicants do not concede, the wafer remains unconstrained while adhering the tape to the wafer. McKenna, Col. 4, lines 42-60; FIGs. 1-4.

Claim 32 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes defining the uncut peripheral ring of material from semiconductor material. As discussed above, the meager disclosure of Lu that a wafer is singulated into a series of dice, 32a, 32b, 32c “through a method as is conventional in the art” does not teach or suggest the limitation in claim 32. Lu, Col. 6, lines 60-67; FIG. 3.

Claim 33 is additionally allowable because neither Lu nor McKenna teaches or suggests a

method that includes defining the uncut peripheral ring of material at least in part from a polymer disposed about and contiguous with the semiconductor wafer. It is respectfully noted that Lu refers to the “carrier layer [28] within the adhesive tape backing [30]” that may be formed from polymer layers, not a semiconductor wafer as the Examiner asserts.

Claim 34 is additionally allowable because neither Lu nor McKenna teaches or suggests a method that includes defining the uncut peripheral ring of material at least in part from a polymer disposed about and contiguous with the semiconductor wafer. It is respectfully noted that Lu refers to the “carrier layer [28] within the adhesive tape backing [30]” that may be formed from polymer layers, not a semiconductor wafer as the Examiner asserts.

Therefore, in view of the foregoing arguments, the withdrawal of the 35 U.S.C. § 103(a) rejections of claims 1-6, 8-14, and 29-34 is respectfully requested.

Obviousness Rejection Based on U.S. Patent No. 5,827,394 to Lu in view of U.S. Patent No. 6,471,806 to McKenna, et al. in further view of U.S. Patent No. 6,551,906 to Oka

Claims 7 and 35 through 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu in view of McKenna, in further view of Oka, U.S. Patent No. 6,551,906 (hereinafter “Oka”). Applicants respectfully traverse this rejection, as hereinafter set forth.

The withdrawal of the 35 U.S.C. § 103(a) rejections of claim 7 is respectfully requested as it depends directly from allowable independent claim 1, among other reasons. Additionally, the withdrawal of the 35 U.S.C. § 103(a) rejections of claims 35-39 is respectfully requested as each depends either directly or indirectly from allowable independent claim 29, among other reasons.

Dependent claims 35-39 each recite a method related to handling and processing a 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers. More specifically, claims 35 recites a method of singulating a 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers. Claim 36 recites a method of singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck. Claim 37 recites a method of holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated

individual components. Claim 38 recites a method of handling a 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers, and claim 39 recites a method of processing the 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers.

Oka teaches, in figures 1A-7H and corresponding text, a method of grinding a semiconductor wafer to desired *thickness* prior to singulation. Contrary to the examiner's assertion, it is respectfully noted that Oka refers to the increase in the diameter of wafers over time and does not teach or suggest the processing of 300 mm wafers with equipment designed to process 200 mm wafers. *See, e.g.*, Oka, Col. 2, lines 9-15. Specifically, Oka does not teach or suggest a method that includes singulating a 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers (claim 35); singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck (claim 36); holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated individual components (claim 37); handling a 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers (claim 38); or, processing the 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers (claim 39).

Thus, because Lu, in view of McKenna and Oka, does not teach or suggest every element of dependent claims 35-39, they are non-obvious. Further, Oka teaches a method of reducing the thickness of semiconductor wafers, not a method that includes processing 300 mm semiconductor wafers on equipment sized to handle 200 mm wafers. Therefore, there is no motive or suggestion to combine Oka with Lu or McKenna. It appears that the Office is undertaking a rejection of claims 35-39 improperly based on hindsight, relying on Applicants' own disclosure for a motivation or suggestion to combine the references. Thus, claims 35-39 are additionally allowable as non-obvious and the withdrawal of their rejection under 35 U.S.C. §103(a) is respectfully requested.

Obviousness Rejection Based on U.S. Patent No. 5,827,394 to Lu in view of U.S. Patent No. 6,551,906 to Oka

Claims 26 through 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lu in view of Oka. Applicants respectfully traverse this rejection, as hereinafter set forth.

The withdrawal of the 35 U.S.C. § 103(a) rejections of claims 26-28 is respectfully requested as each depends either directly or indirectly from allowable independent claim 25, among other reasons.

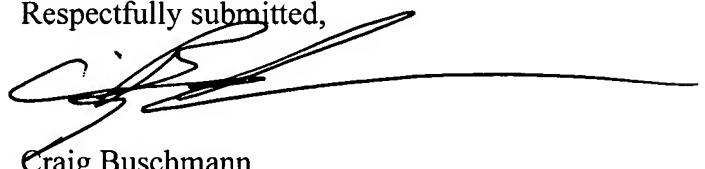
As discussed above with respect to claims 35-39, Lu, in view of Oka, does not teach or suggest a method that includes handling a 300 mm diameter wafer in equipment designed to handle 200 mm diameter wafers, among others. Specifically, neither Lu or Oka teaches or suggests a method that includes singulating a 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers (claim 26); singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck (claim 27); or, holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated individual components (claim 28).

Because Lu, in view of Oka, does not teach or suggest every element of dependent claims 26-28, they are non-obvious. Further, Oka teaches a method of reducing the thickness of semiconductor wafers, not a method processing 300 mm semiconductor wafers on equipment sized to handle 200 mm wafers. Therefore, there is no motive or suggestion to combine Oka with Lu. As noted above, it appears that the Office is relying upon Applicants' own disclosure for a motivation or suggestion to combine the references. Thus, claims 26-28 are additionally allowable and the withdrawal of their rejections under 35 U.S.C. §103(a) is respectfully requested.

CONCLUSION

Claims 1-39 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



Craig Buschmann
Registration No. 57,829
Attorney for Applicants
TRASKBRITT
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

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